AMENDMENTS TO THE CLAIMS

Claims 1 - 38 (canceled).

39. (currently amended) A method for manufacturing a magnetic memory element comprising:

forming a pinned ~~or reference~~ layer with a magnetization in a first direction ~~over~~ supported by a substrate;

forming a tunnel barrier layer ~~over~~ adjacent the pinned layer; and

forming a sense layer ~~over~~ adjacent a side of the tunnel barrier layer opposite the pinned layer, said sense layer having a first ferromagnetic layer and a second ferromagnetic layer mutually separated by a conductive spacer layer and a characteristic which results in stray field coupling and antiferromagnetic exchange coupling between said first and second ferromagnetic layers.

40. (currently amended) A method of claim 39 wherein the act of forming said sense layer further comprises:

forming said first ~~magnetization~~ ferromagnetic layer over the tunnel barrier layer;

forming [[a]] said conductive spacer layer over the first ~~magnetization~~ ferromagnetic layer; and

forming the second ~~magnetization~~ ferromagnetic layer over the conductive spacer layer.

AMENDMENTS TO THE CLAIMS

Claims 1 - 38 (canceled).

39. (currently amended) A method for manufacturing a magnetic memory element comprising:

forming a pinned ~~or reference~~ layer with a magnetization in a first direction over a substrate;

forming a tunnel barrier layer ~~over~~ adjacent the pinned layer; and

forming a sense layer ~~over~~ adjacent a side of the tunnel barrier layer opposite the pinned layer, said sense layer having a first ferromagnetic layer and a second ferromagnetic layer mutually separated by a conductive spacer layer and a characteristic which results in stray field coupling and antiferromagnetic exchange coupling between said first and second ferromagnetic layers.

40. (currently amended) A method of claim 39 wherein the act of forming said sense layer further comprises:

forming said first ~~magnetization~~ ferromagnetic layer over the tunnel barrier layer;

forming [[a]] said conductive spacer layer over the first ~~magnetization~~ ferromagnetic layer; and

forming the second ~~magnetization~~ ferromagnetic layer over the conductive spacer layer.

41. (original) A method of claim 40 further comprising smoothing a surface of the pinned layer before forming another layer on said pinned layer.

42. (currently amended) A method of claim 40 further comprising smoothing the first ~~magnetization~~ <u>ferromagnetic</u> layer before forming [[a]] <u>said conductive</u> spacer layer.

43. (currently amended) A method of claim 40 wherein said first and second ~~magnetizable~~ <u>ferromagnetic</u> layers are formed of a material comprising NiFe.

44. (currently amended) A method of claim 40 wherein said first and second ~~magnetizable~~ <u>ferromagnetic</u> layers are formed of a material comprising CoFe.

45. (currently amended) A method of claim 40 wherein said first and second ~~magnetizable~~ <u>ferromagnetic</u> layers are formed of a material comprising Co.

46. (currently amended) A method of claim 40 wherein said first and second ~~magnetizable~~ <u>ferromagnetic</u> layers are formed of a material comprising Fe.

47. (currently amended) A method of claim 40 wherein said first and second ~~magnetizable~~ <u>ferromagnetic</u> layers are formed of a material comprising Ni

48. (currently amended) A method of claim 40 wherein said first and second ~~magnetizable~~ ferromagnetic layers are formed of a material comprising NiFeCo.

49. (currently amended) A method of claim 40 wherein said conductive spacer layer comprises a Ru layer.

50. (currently amended) A method of claim 40 wherein said conductive spacer layer comprises a Cu layer.

51. (currently amended) A method of claim 40 wherein said conductive spacer is a conductor that is not ferromagnetic or antiferromagnetic.

52. (currently amended) A method of claim 40 wherein said conductive spacer layer is formed with a thickness such that the antiferromagnetic exchange coupling between said first and second ~~magnetizable~~ ferromagnetic layers is less than the coercive (H) field value of the one of the first or second ~~magnetizable layer~~ ferromagnetic layers which has the largest coercive field value.

53. (currently amended) A method of claim 40 where forming said layers is such that the layers are formed of a material and thickness sufficient to provide stray field coupling and antiferromagnetic exchange coupling, said antiferromagnetic exchange coupling is within the range of greater than 0 to <= ~~300~~ 200 Oe between the first and second ferromagnetic layers across said conductive spacer layer.

54. (currently amended) A method of claim 40 wherein said step of forming the first and second ~~magnetization~~ ferromagnetic layers

includes forming said first and second ferromagnetic layers including NiFe.

55. (original) A method of claim 40 wherein second layer is formed with a thickness t and first layer is formed with a thickness greater than t.

56. (currently amended) A method of claim 40 further comprising:

forming a thinner layer, relative to the first ~~magnetizable~~ ferromagnetic layer, of Co interposed between the conductive spacer layer and the first ~~magnetizable~~ ferromagnetic layer; and

forming a thinner layer, relative to the second ~~magnetizable~~ ferromagnetic layer, of Co interposed between the conductive spacer layer and the second ~~magnetizable~~ ferromagnetic layer.

57. (currently amended) A sense layer of claim 40 further comprising:

forming a thinner layer, relative to the first ~~magnetizable~~ ferromagnetic layer, of CoFe interposed between the conductive spacer layer and the first ~~magnetizable~~ ferromagnetic layer; and

forming a thinner layer, relative to the second ~~magnetizable~~ ferromagnetic layer, of CoFe interposed between the conductive spacer layer and the second ~~magnetizable~~ ferromagnetic layer.

58. (currently amended) A method for manufacturing a magnetic memory element comprising:

forming a sense layer ~~over a substrate~~, said sense layer having a first ferromagnetic layer and a second ferromagnetic layer mutually separated by a conductive spacer layer and a characteristic which results in stray field coupling and antiferromagnetic exchange coupling between said first and second ferromagnetic layers across said conductive spacer layer;

forming a tunnel barrier layer ~~over~~ adjacent the sense layer; and

forming a pinned or reference layer with a magnetization in a first direction ~~over~~ adjacent a side of said tunnel barrier opposite said sense layer.

59. (currently amended) A method of claim 58 wherein the act of forming said sense layer further comprises:

forming said first ~~magnetization~~ ferromagnetic layer over the tunnel barrier layer;

forming a conductive spacer layer over the first ~~magnetization~~ ferromagnetic layer; and

forming the second ~~magnetization~~ ferromagnetic layer over the conductive spacer layer.

60. (currently amended) A method of claim 58 wherein said conductive spacer layer is formed with a thickness such that the

antiferromagnetic exchange coupling between said first and second ~~magnetizable~~ ferromagnetic layers is less than the coercive (H) field value of the one of the first or second ferromagnetic layer which has the largest coercive field value.

61. (currently amended) A method of claim 58 where forming said layers is such that the layers are formed of a material and thickness sufficient to provide stray field coupling and antiferromagnetic exchange coupling, said antiferromagnetic exchange coupling is greater than 0 and <= 200 Oe between the first and second ferromagnetic layers across said conductive spacer layer.

62. (currently amended) A method of claim 58 wherein second ~~magnetizable~~ ferromagnetic layer is formed with a thickness t and first ~~magnetizable~~ ferromagnetic layer is formed with a thickness greater than t.

63. (currently amended) A method for manufacturing a magnetic memory element comprising:

forming a pinned ~~or reference~~ layer with a magnetization in a first direction over a substrate;

smoothing a surface of the pinned layer;

forming a tunnel barrier layer over the pinned layer; and

forming a sense layer over the tunnel barrier layer, said act of forming said sense layer comprising:

forming ~~said~~ a first magnetization layer over the tunnel barrier layer;

smoothing the first magnetization layer;

forming a spacer layer over the first magnetization layer;

forming a second magnetization layer over of the spacer layer;

said first and second magnetization layers and spacer layer being formed such that said layers are stray field coupled and antiferromagnetic exchange coupled across said spacer layer;

said first and second ~~magnetizable layer are formed having a~~ magnetization layers being formed such that said first layer has a magnetic saturation times said first layer ~~layer's~~ thickness ~~which is~~ not equal to said second layer ~~layer's~~ magnetic saturation times said second layer thickness ~~of the second magnetizable layer~~.

64. (currently amended) A method of claim 63 wherein said spacer layer is formed with a thickness such that the antiferromagnetic exchange coupling between said first and second ~~magnetizable~~ magnetization layers is less than the coercive (H) field value of the one of the first or second ~~magnetizable~~ magnetization layer which has the largest coercive field value.

65. (currently amended) A method of claim 63 wherein sense layer is formed having antiferromagnetic exchange coupling between first and second magnetization ~~layer~~ layers of more than zero and less

than a value which prevents magnetic orientation switching of said sense layer in the presence of an applied magnetic field.

66. (currently amended) A method of claim 63 wherein said first magnetization layer, spacer layer and second magnetization layer are formed of materials and ~~thickness²~~ and have thickness sufficient to provide stray field coupling and antiferromagnetic exchange coupling between said first and second ~~magnetizable~~ magnetization layers and across said spacer layer, said antiferromagnetic exchange coupling is greater than 0 <= 200 Oe.

67. (original) A method of claim 63 wherein the second magnetization layer is formed with a thickness t and first layer is formed with a thickness greater than t.

Claims 68 – 72 (cancelled).

73. (currently amended) A method for manufacturing a magnetic memory element comprising:

forming a pinned ~~or reference~~ layer with a magnetization in a first direction over a substrate;

forming a conductive layer ~~over~~ adjacent the pinned layer for creating a giant magnetoresistance effect; and

forming a sense layer ~~over~~ on a side of the conductive layer opposite the pinned layer, said sense layer having a first and second ferromagnetic ~~layer~~ layers mutually separated by a conductive spacer layer and a characteristic which results in stray field coupling and

antiferromagnetic exchange coupling between said first and second ferromagnetic layers.

74. (currently amended) A method of claim 73, wherein the act of forming said sense layer further comprises:

forming said first ~~magnetization~~ <u>ferromagnetic</u> layer over the conductive layer;

forming a <u>conductive</u> spacer layer over the first ~~magnetization~~ <u>ferromagnetic</u> layer; and

forming the second ~~magnetization~~ <u>ferromagnetic</u> layer over the <u>conductive</u> spacer layer.

75. (currently amended) A method of claim 73, wherein forming said layers is such that the layers are formed of a material and <u>have a</u> thickness sufficient to provide stray field coupling and antiferromagnetic exchange coupling, said antiferromagnetic exchange coupling is within the range of greater than 0 to <= ~~300~~ <u>200</u> Oe between the first and second <u>ferromagnetic</u> layers across said <u>conductive</u> spacer layer.

76. (currently amended) A method of claim 73, wherein <u>the</u> second <u>ferromagnetic</u> layer is formed with a thickness t and <u>the</u> first layer is formed with a thickness greater than t.

77. (previously presented) A method of claim 73, wherein said pinned or reference layer is a synthetic ferrimagnet.